WHAT IS CLAIMED IS:

1. A charging apparatus, comprising:

a cooling fan for cooling a battery pack;

a battery temperature detecting unit configured to detect a battery temperature of the battery pack; and

a control unit configured to determine presence or non-presence of cooling effect, to determine full charge of the battery and to control a charging current based on an output of the battery temperature detecting unit;

wherein, when the control unit determines that there is no cooling effect by the cooling fan and the battery temperature reaches a first predetermined value smaller than a maximum value of a temperature range in which the battery is chargeable without making a life time thereof shorter, the control unit changes the charging current to a first charging current value where increase of the battery temperature due to charging is suppressed; and

wherein, when the control unit determines that there is cooling effect by the cooling fan and the battery temperature reaches a second predetermined value higher than the first predetermined value, the control unit changes the charging current to a second charging current value larger than the first charging current value.

2. A charging apparatus, comprising:

a cooling fan for cooling a battery pack;

a battery temperature detecting unit configured to detect a temperature of a battery;

a battery temperature storage unit configured to store a battery temperature based on an output from the battery temperature detecting means;

a battery temperature changing rate calculation unit configured to calculate a plurality of battery temperature changing rates with different sampling intervals including a first sampling interval and a second sampling interval longer than the first sampling interval, based on outputs from the battery temperature detecting unit and the battery temperature storage unit; and

a battery temperature changing rate storage unit configured to store the plurality of battery temperature changing rates based on an output from the battery temperature changing rate calculation unit;

wherein a full charge state of the battery pack is detected by a battery temperature changing rate with the first sampling interval based on an output from the battery temperature changing rate calculation unit and the battery temperature changing rate storage unit; and

existence or non-existence of cooling effect due to the cooling fan is determined by a battery temperature changing rate with the second sampling interval.

3. A charging apparatus, comprising:

a cooling fan for cooling a battery pack;

a battery temperature detecting unit configured to detect a temperature of a battery;

a battery temperature storage unit configured to store a battery temperature based on an output from the battery temperature detecting means;

a battery temperature changing rate calculation unit configured to calculate a plurality of battery temperature changing rates based on outputs from the battery temperature detecting unit and the battery temperature storage unit; and

a battery temperature changing rate storage unit configured to store the plurality of battery temperature changing rates based on an output from the battery temperature changing rate calculation unit;

wherein the battery temperature changing rate storage unit stores a minimum value of the battery temperature changing rates; and

wherein existence or non-existence of cooling effect due to the cooling fan is determined depending on whether or not the minimum value of the battery temperature changing rates when the battery temperature during a charging operation reaches a predetermined temperature is larger than a preset first predetermined value.

4. The charging apparatus according to claim 3, wherein the first predetermined value is set in correspondence with a temperature voltage at a time of start of charging.

5. A charging apparatus, comprising:

a cooling fan for cooling a battery pack;

a battery temperature detecting unit configured to detect a temperature of a battery;

a battery temperature storage unit configured to store a battery temperature based on an output from the battery temperature detecting means;

a battery temperature changing rate calculation unit configured to calculate a plurality of battery temperature changing rates based on outputs from the battery temperature detecting unit and the battery temperature storage unit; and

a battery temperature changing rate storage unit configured to store the plurality of battery temperature changing rates based on an output from the battery temperature changing rate calculation unit;

wherein existence or non-existence of cooling effect due to the cooling fan is determined depending on whether or not a battery temperature changing rate calculated for the first time by the battery temperature changing rate calculation unit is larger than a preset second predetermined value.

6. The charging apparatus according to claim 5, wherein the second predetermined value for determining the existence or non-existence of cooling effect is set in correspondence with a battery temperature at a time of start of charging.